

REMARKS

Claims 1-16 and 56-71 are presently pending. Claims 16 and 56-71 have been allowed. Claims 1-15 have been rejected. No claims have been added or canceled since the previous office action. Claims 17-55 have been previously withdrawn. Claims 1, 8, and 14 have been amended. Reconsideration in light of the following remarks is respectfully requested.

Rejection under 35 U.S.C. 103

The Examiner rejected claims 1-6 and 8-15 under 35 U.S.C. 103(a) as being unpatentable over Goodson, jr. et al. '470 in view of Yezerksy et al. The rejection is respectfully traversed.

With regard to claims 1-6 and 8-15, the office action states:

Goodson, Jr. et al. '470 (Fig. 2) discloses a fluid control device for use in a string of tools in a borehole in which there is a housing (50), a piston (60), a MR fluid (66) and a magnetic assembly (68). The MR fluid is disposed within the housing and can be made to block flow through use of the magnetic assembly. The magnetic assembly is an electromagnet that generates a magnetic field when powered. When the MR fluid blocks flow it impedes movement of the piston. Total blockage of the flow stops the piston while partial blockage due to the fluid will slow movement of the piston, as is the nature of MR fluids. The release of a valve (56) is stopped while the MR fluid blocks the housing which in turn blocks the piston. Goodson, Jr. et al. '470 does not disclose that there is both a permanent magnet and an electromagnet in the magnetic assembly nor does it disclose that in the unpowered state there is a magnetic field. Nor does it disclose that the magnetic field acts substantially perpendicular to a pressure gradient. Yezerksy et al. (Fig. 2, col. 3 lines 25-41) discloses a control for an MR fluid in which there is both a permanent magnet and an electromagnet. The permanent magnet supplies a magnetic force to solidify the MR fluid in the unpowered state in which the magnetic field acts substantially perpendicular to pressure gradient. The electromagnet, when activated, will counter the magnetic force of the permanent magnet and allow the MR fluid to become fluid. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the activation system of Yezerksy et al. with the apparatus of Goodson, Jr. et al. '470. This would be done so that power would not have to constantly be supplied downhole and a current would only be required when it was desired to activate the apparatus.

In response to applicants previous assertions, Examiner states,

...

It is the assertion of the applicant that the Goodson document fails to disclose that varying the magnetic field can enable partial blockage and slow the piston. Examiner respectfully traverses this assertion. The applicant quoted a relevant passage from the Goodson document in which it states, "either highly viscous or solid when a small magnetic field is applied." This statement allows for a viscous state to be achieved, which would not stop the piston but would impede its progress.

The applicant would like to thank the examiner for an additional opportunity to more clearly explain the differences between the claimed invention and the cited art. Applicant respectfully disagrees with Examiner's contention that the highly viscous fluid of Goodson would impede its progress. Such feature is not taught or suggested by Goodson. In fact, Goodson clearly teaches away from such limitation. A reference may be said to "teach away" from the claimed invention when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. *In re Gurley*, 27 F.3d 551, 553, 31 U.S.P.Q.2D 1130, 1131 (Fed. Cir. 1995). Rather than teaching partial cancellation of the magnetic field to impede the movement of a piston as the presently claimed invention, Goodson teaches either an orifice¹ or a mechanical spring² to bias movement of a setting piston. For example, in multiple places Goodson states, the winding is "energized"³ or the coil is "de-energized."⁴ Nowhere in the patent application does Goodson teach the partial cancellation of a magnetic field, but in each place the field is energized, the fluid prevents bypass flow,⁵ or substantially solidifies the ER fluid.⁶ Similarly, in each place the Goodson reference discusses that the field is de-energized, another biasing device, such as an orifice or a mechanical spring is used to impede piston movement. Goodson fails to teach, suggest, or appreciate the fact that such biased movement can occur by partial cancellation of the magnetic field. Consequently, the Applicants respectfully request Examiner withdraw the rejection.

¹ Col. 3, lns. 44-48; Numeral 40 of Figure 1.

² Col. 2, ln. 31-34; Numeral 64 of Figure 2; Numeral 89 of Figure 3

³ Col. 4, ln. 1-4; Col. 5, lns. 55-57.

⁴ Col. 4, lns. 4-6; Col. 5, lns. 2-4; Col. 5, lns. 53-57.

⁵ E.g., Col. 4, lns. 1-3.

⁶ E.g., Col. 4, lns. 55-56; Col. 5, lns. 2-4.

Further, Yezerky teaches that “the magnetic field generated causes the MRF 12, to solidify in milliseconds.”⁷ Similarly, “[o]nce the current is turned off, the electromagnet 24, ceases to create the magnetic field and the MRF 12 quickly retains its fluid form. This allows for free slidable movement of the shaft 22 within the housing.”⁸ Free slidable movement is not the same as impeded movement as the presently claimed invention. The Yezerky reference, like the Goodson reference, clearly teaches away from using partial or full cancellation of a magnetic field to impede the movement of a piston. Consequently, applicants respectfully request Examiner withdraw the rejection as to claims 1-6 and 8-15.

The Examiner rejected claims 1-15 under 35 U.S.C. 103(a) as being unpatentable over Burleson in view of Yezerky et al. The rejection is respectfully traversed.

With regard to claims 1-15, the office action states:

Burleson et al. (Fig. 4A and 4B, col. 8 line 54 – col. 9 line 49) discloses a downhole tool in which there is a housing (94), a piston (104), and a transitional material (122). The transitional material is disposed within the housing and can be made to block flow. When the transitional material blocks flow it impedes movement of the piston. Total blockage of the flow stops the piston while partial blockage due to the fluid will slow movement of the piston, as is the nature of transitional materials. Burleson et al. does not disclose that the transitional fluid is an MR fluid nor does it disclose a magnetic assembly to activate the MR fluid. Nor does it disclose that the magnetic field acts substantially perpendicular to a pressure gradient. Yezerky et al. (Fig. 2, col. 3 lines 25-41) discloses a control for an MR fluid in which there is both a permanent magnet and an electromagnet. The permanent magnet supplies a magnetic force to solidify the MR fluid in the unpowered state in which the magnetic field acts substantially perpendicular to pressure gradient. The electromagnet, when activated, will counter the magnetic force of the permanent magnet and allow the MR fluid to become fluid. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the activation system and MR fluid of Yezerky et al. with the apparatus of Burleson et al. This would be done to allow activation of the apparatus from the top of the borehole with a more reliable system that is electrically based as opposed to temperature based.

⁷ Col. 3, lns. 4-5.

⁸ Col. 3, lns. 10-14.

With regards to claim 7, the piston of the apparatus as disclosed is capable of being controlled to provide a time-control device. As this feature is an intended use of the piston, and does not provide further structural definition to the device it is of little patentable weight.

In response to applicants previous assertions, Examiner states,

...

In the case of Burleson and Yezerksy, there is a reasonable expectation of success in the combination of these references since both deals with stopping the flow of a transitional fluid. Using the system of Yezerksy would allow the controller at the top of the wellbore to know exactly when the explosive assembly would go off instead of relying on measurements of temperature and depth. It is common knowledge to one of ordinary skill in the wellbore art that the activation of downhole objects is preferred to be done by an operator instead of a variable of the wellbore that might change.

...

It is the assertion of the applicant that the combination of Burleson and Yezerksy fails to teach "partial blockage of the flow of magnetorheological fluid through said housing by a magnetic field slows movement of said piston." The examiner respectfully traverses this assertion. It is an inherent feature of the invention that this will occur if a MR fluid is used with an electromagnet as an activator. The fluid as well as the field will go through a transitional period between states of viscosity and strength as the electromagnet is powered and unpowered.

Examiner's contention that the "field will go through a transitional period between states of viscosity and strength as the electromagnet is powered and unpowered" is unsupported by the teachings of Yezerksy. As discussed above, Yezerksy teaches that "the magnetic field generated causes the MRF 12, to solidify in milliseconds."⁹ Similarly, "[o]nce the current is turned off, the electromagnet 24, ceases to create the magnetic field and the MRF 12 quickly retains its fluid form. This allows for free slidable movement of the shaft 22 within the housing."¹⁰ Free slidable movement is not the same as impeded movement as the presently claimed invention.

⁹ Col. 3, lns. 4-5 (emphasis added)

¹⁰ Col. 3, lns. 10-14 (emphasis added).

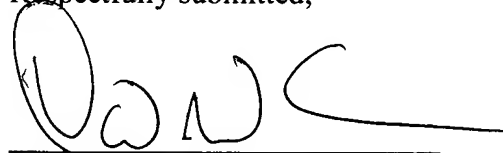
Further, Examiner's contention that, "[i]t is common knowledge to one of ordinary skill in the wellbore art that the activation of downhole objects is preferred to be done by an operator instead of a variable of the wellbore that might change," is unsupported by the teachings of Burleson. Burleson teaches that conditions downhole are "generally predetermined or known conditions."¹¹ There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself. *In re Oetiker*, 977 F.2d 1443, 1447, 24 U.S.P.Q.2d 1443, 1446 (Fed. Cir. 1992). Applicant traverses Examiner's assertion and requests that Examiner cite a reference in support of his position as required by MPEP § 2144.03.

In view of the above, Applicant respectfully submits that the rejection of claims 1-15 is overcome. Accordingly, it is respectfully urged that the rejections of claims 1-15 not be sustained.

CONCLUSION

It is respectfully urged that the subject application is now in condition for allowance. The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'DWC', is written over a horizontal line.

David W. Carstens
Registration No. 34,134

Date: August 1, 2005

CARSTENS & CAHOON, LLP
P.O. Box 802334
Dallas, TX 75380
(972) 367-2001 Telephone
(972) 367-2002 Facsimile

¹¹ See col. 1, lns. 10-13.